

## CLAIMS

1. Method for processing a rubber mixture or a compound for the manufacturing of tyres, said processing comprising at least a mixing cycle and an extrusion cycle for obtaining a semi-finished product and wherein said cycles are controlled by process parameters detected during execution thereof, characterized in that it comprises the steps of:

a) determining variation tolerances with respect to reference values for the process parameters;

b) comparing the detected values of the process parameters with the reference values;

c) attributing an evaluation to the semi-finished product depending on the compliance or non-compliance of the values detected with the predefined tolerances;

d) classifying the semi-finished product on the basis of the evaluation attributed;

e) establishing the successive steps for processing of the semi-finished product depending on classification thereof.

2. Method according to Claim 1, wherein steps b) to e) are performed in an automated manner.

3. Method according to Claim 1, wherein the process parameters detected comprise one or more of the following parameters: duration of the mixing cycle or of at least a part thereof; temperature and energy absorbed by the mixture or by the compound during the mixing cycle or at least a part thereof; duration of the extrusion operation.

4. Method according to Claim 3, wherein the mixing cycle is performed with at least one internal mixer (10) of the Banbury® or Intermix® type.

5. Method according to Claim 4, wherein a coefficient indicating the compliance with the predefined tolerances is attributed for the process parameters detected during the mixing cycle, and wherein the evaluation of the semi-finished product is performed by adding together the coefficients attributed and comparing the result obtained with a reference classification.

6. Method according to Claim 5, wherein the extraction operation is performed using at least one single-screw or double-screw extruder associated with a pair of calendering rolls.

7. Method according to Claim 6, wherein the rolls are of the friction and/or variable speed type.

8. Method according to Claim 5, wherein the extraction operation is performed using at least one single-screw or double-screw extruder and at least one mixer of the open type.

9. Method according to Claim 5, wherein the stay time in the extruder is detected for the extraction operation and the evaluation of the semi-finished product is performed by comparing the time detected with a reference classification.

10. Method according to Claim 9, wherein the semi-finished product is marked downstream from the extraction operation so as to be identified and separated from other semi-finished products obtained prior to and/or subsequent thereto.

11. Method according to Claim 10, wherein the processed mixture or compound comprises silica as the reinforcing element.

12. Method according to Claim 11, wherein the obtained final compound comprises at least the following ingredients, in variable quantities and per hundred parts by weight of polymeric base (phr), between the following limits:

|                               |                  |
|-------------------------------|------------------|
| Polymeric base                | 100              |
| Carbon black                  | 0-80             |
| Silica                        | 10-80            |
| Bonding agent                 | 4%-15% of silica |
| Zinc oxide (ZnO)              | 1-3              |
| Stearic acid                  | 0-3              |
| Anti-degradation agents       | 1-3              |
| Plasticizing oil              | 0-30             |
| Anti-ozone wax                | 0.5-3            |
| Specific chemical ingredients | 0-15             |

13. Method according to Claim 12, wherein the final compound vulcanized for 30 minutes at 151 °C has the following characteristics:

| Characteristic            |                      | Mean value | Variability |
|---------------------------|----------------------|------------|-------------|
| Density                   | (g/cm <sup>3</sup> ) | 1.196      | ±0.004      |
| 100% modulus (CA1)        | (MPa)                | 2.3        | ±0.2        |
| 300% modulus (CA3)        | (MPa)                | 9.8        | ±0.6        |
| Ultimate tensile strenght | (MPa)                | >15.0      |             |
| Ultimate elongation       | (%)                  | >400       |             |
| Hardness                  | (IRHD)               | 73         | ±2          |